

ICTP RESEARCH  
ON DIGITAL LECTURES:  
***YOUR TALKS DELIVERED  
TO A MILLION SCIENTISTS***

*ICTP, 15 March 2007*



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*sdu*

# ICTP SDU

The Science Dissemination Unit has been created in late 2004 with the broad aim of **disseminating ICTP scientific contents and programs to more people than are able to visit the Centre**, throughout the world, via electronic, digital, satellite and other information and communication tools.



A world map is centered on the image, with the continents of North America, Europe, and Africa visible. The map is rendered in a dark blue color with a glowing yellow and orange outline, suggesting a digital or data theme. The background is a dark blue gradient with a pattern of binary code (0s and 1s) in various colors (white, yellow, green, purple) scattered across it.

Workshops on ICT

Open Source for Science

Digital Lectures

iRooms

eJDS

PingER

Open Access (African Physical Review, e-Print Archive)



# Digital Lectures

- Two years ago, we started to think on how to create a web archive of video recordings of seminars delivered at ICTP by renowned guests.

## Tsunami Physics and Preparedness

March 24, 2005

*Selected lectures from the special workshop organized by the ICTP SAND Group (Structure and Non-Linear Dynamics of the Earth) after the tragic Tsunami event of December 2004.*

## The Wobbly Wind

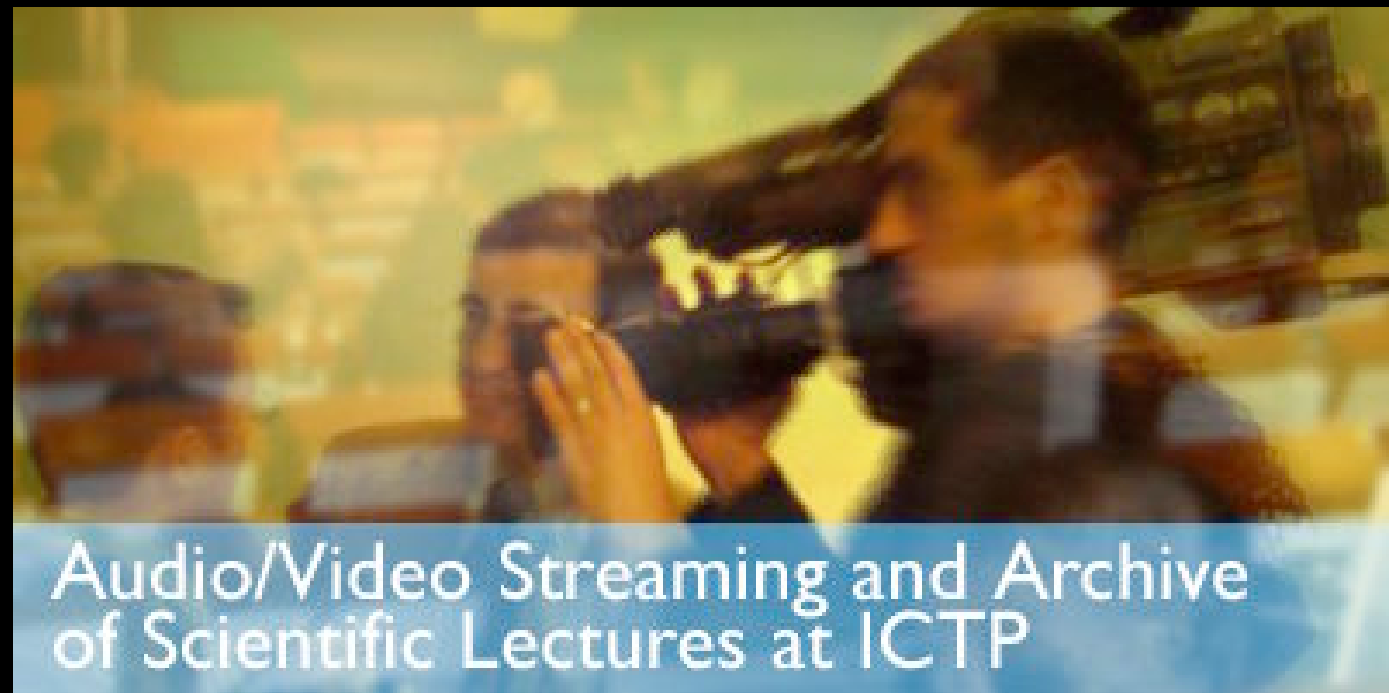
March 23, 2005

*Scientific talk on physics of thermal convection, given by ICTP Director Prof. Katepalli R. Sreenivasan for the SISSA Colloquium Series.*

## ICTP Dirac Medal 2004

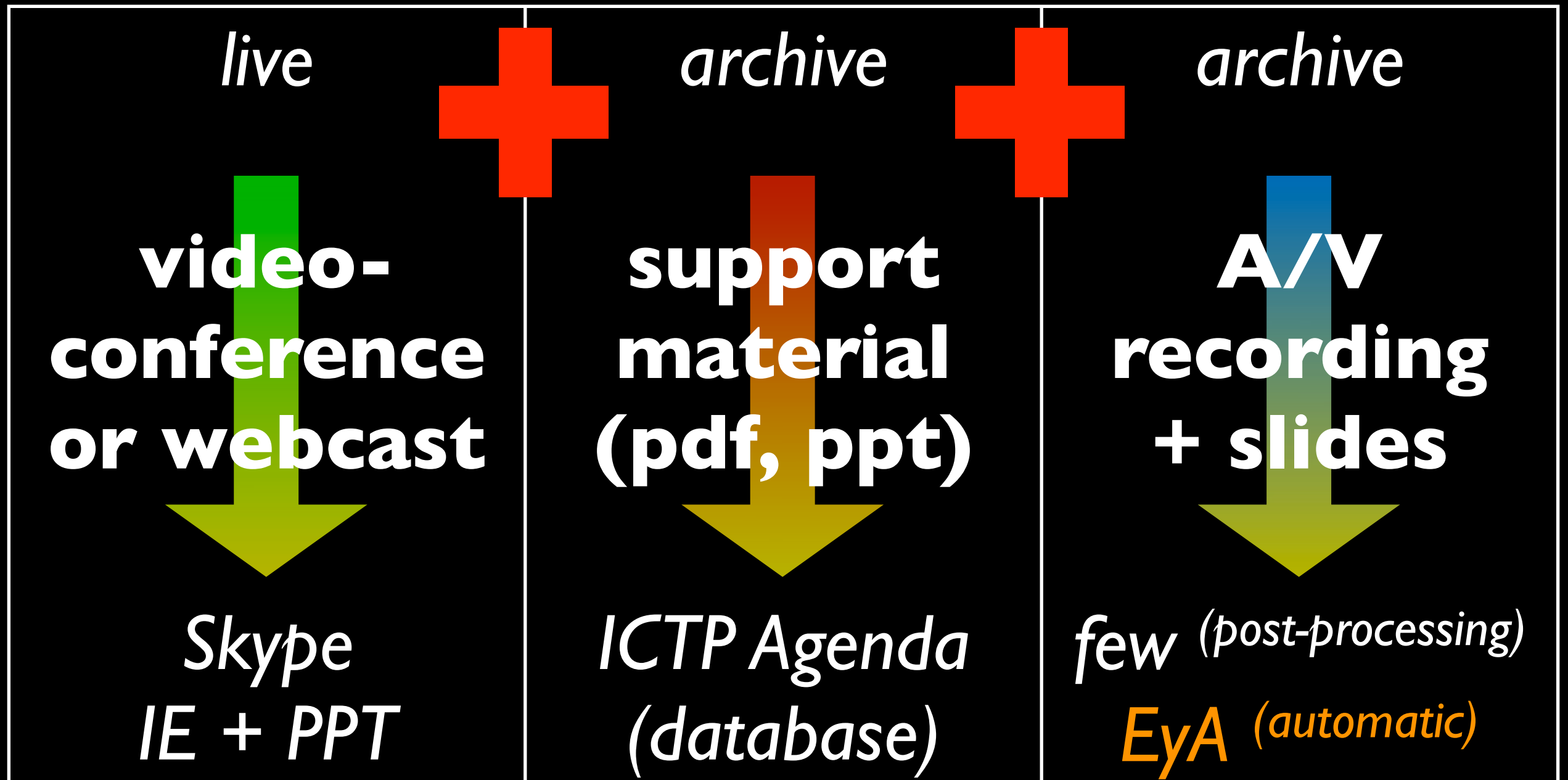
March 16, 2005

*The 2004 Dirac Medal of the ICTP awarded to James D. Bjorken and Curtis G. Callan during an award ceremony hold at the Centre on Wednesday, March 16, 2005.*



# Three-fold way

**Those three are complementary solutions!**



# Examples of DL

## MIT:

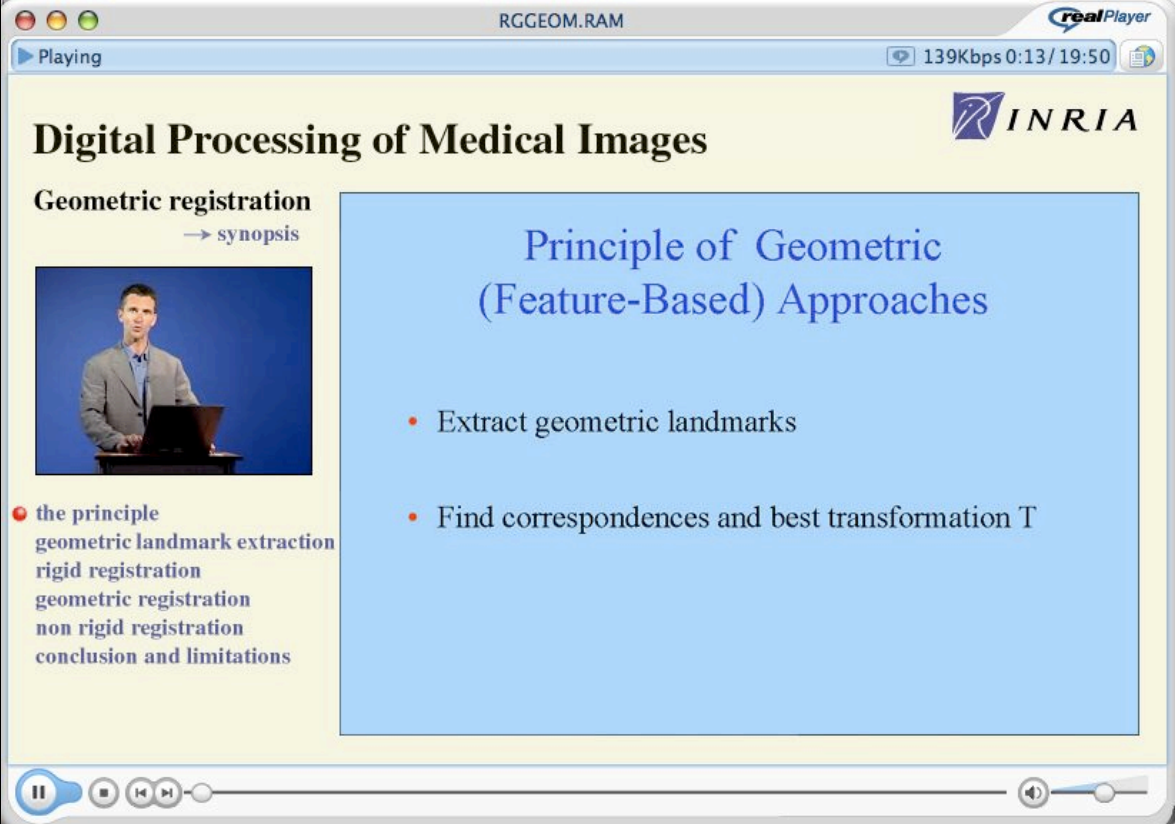
- RealVideo
- Bandwidth Selection
- No Slides
- No download
- Post-processed



# Examples of DL

## INRIA:

- RealVideo+XML-SMIL
- Synchronized Slides
- Post-processed




The screenshot shows a RealPlayer window titled "RGGEOM.RAM" with a "Playing" status bar. The main content is a presentation slide from INRIA. The slide title is "Digital Processing of Medical Images" and the current slide is "Principle of Geometric (Feature-Based) Approaches". The slide content includes a list of topics: "the principle", "geometric landmark extraction", "rigid registration", "geometric registration", "non rigid registration", and "conclusion and limitations". A small video thumbnail shows a presenter at a podium. The slide also lists two key steps: "Extract geometric landmarks" and "Find correspondences and best transformation T". The RealPlayer interface includes standard playback controls at the bottom.

RGGEOM.RAM  
Playing 139Kbps 0:13 / 19:50

**Digital Processing of Medical Images** INRIA

**Geometric registration**  
→ synopsis



- the principle
- geometric landmark extraction
- rigid registration
- geometric registration
- non rigid registration
- conclusion and limitations

**Principle of Geometric (Feature-Based) Approaches**

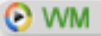



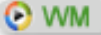



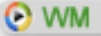



- Extract geometric landmarks
- Find correspondences and best transformation T

# Examples of DL

## ePresence:

- Multi Formats
- Audio only option
- Synchronized Slides
- Post-processed

Dissolving Boundaries. KMDI series (March 2006)


Archive	Presenter	Viewed	Watch
March 9, 2006 Parallel Worlds: The evolution of real and virtual communities	Rodney Hoinkes and Stacey Spiegel	311 times	 WM  Real  QT  MP3
March 23, 2006 Beyond Ryan Due to technical difficulties this archive is incomplete – slides are missing from Chris Landreth's talk. This will be repaired shortly.	Chris Landreth & the Ryan crew from Department of Computer Science, UofT	115 times	 WM  Real  QT  MP3
March30, 2006 Body image : Image of the body	Shannon Bell & Johanna Householder	78 times	 WM  Real  QT  MP3



# Examples of DL

## Cambridge:

- Quicktime
- No Slides
- Post-processed



The screenshot shows the ScienceLive.org website. The header features the URL "www.ScienceLive.org" in a stylized font with colored dots. Below the header is a "Video Archive" section with the title "Browse the ScienceLive video archive". A selection menu shows "movies lectures interviews all". A table lists video titles and the names of the people who starred in them.

Title	Starring ...
<a href="#">A Beginner's Guide to Geological Time</a>	The Time Truck and CUSP
<a href="#">A small nanomachine that makes the Irish flag</a>	Tim Mantle
<a href="#">A visit by C. F. Fitzgerald</a>	Denis Weaire
<a href="#">All about Hamilton</a>	James Lunney
<a href="#">Astronomy</a>	David Moore
<a href="#">Big bang: A history of cosmology</a>	Simon Singh
<a href="#">Can maths tell what happened?</a>	Chris Budd

# Examples of DL

## ICTP-SDU (first version):

- Quicktime
- Audio only option
- Synchronized Slides
- Minimal post-processing
- Downloadable

The screenshot shows a web browser window titled "ICTP-SDU: Digital Lectures Archive". The page header includes the ICTP logo, "Science Dissemination Unit", "Digital Lectures", and "sdu.ictp.it". Below the header, it says "video streaming and archiving of selected scientific lectures @ ICTP". The main content area features a slide titled "Typical (intended) use" with a diagram of a network topology. To the right, there is a video player showing a man presenting. The video player has a progress bar and a "Slide 14" indicator. At the bottom, there is a license notice: "Licensed under Creative Commons by ICTP-SDU. Since March 2005. Disclaimer. You need the QuickTime plug-in to see the movie and the slides. Prototype Service provided by ICTP-Science Dissemination Unit: contact e-mail sdu@ictp.it. Close this window."

# THE problem

- “Our research so far has shown that making streaming video presentations accessible - increases **staff time** by an additional factor of up to fifty.

The cost of **outsourcing** this service at 100% content accuracy is about **\$250 to \$350 per hour of video.**”

[ <http://www.utexas.edu/computer/grants/di4/cit/cit.html> ]

- “...that the key problem of recording is that it is necessary to have **one person in the room** to follow the lecture/recording equipment or even 3 or more persons depending on the number of **lectures going on simultaneously.**”

[ ICTP referee report for an SDU workshop ]

# Our approach

- To have a Digital Lectures system which has:

- ✓ high-quality
- ✓ no human intervention
- ✓ non invasive approach
- ✓ low cost of equipment



*plus few additional requests:*

- ✓ continuous service with minimal maintenance
- ✓ low-bandwidth friendly features (zip, CD/DVD)
- ✓ compatible with all web browsers and Operating Systems



# Boundary conditions

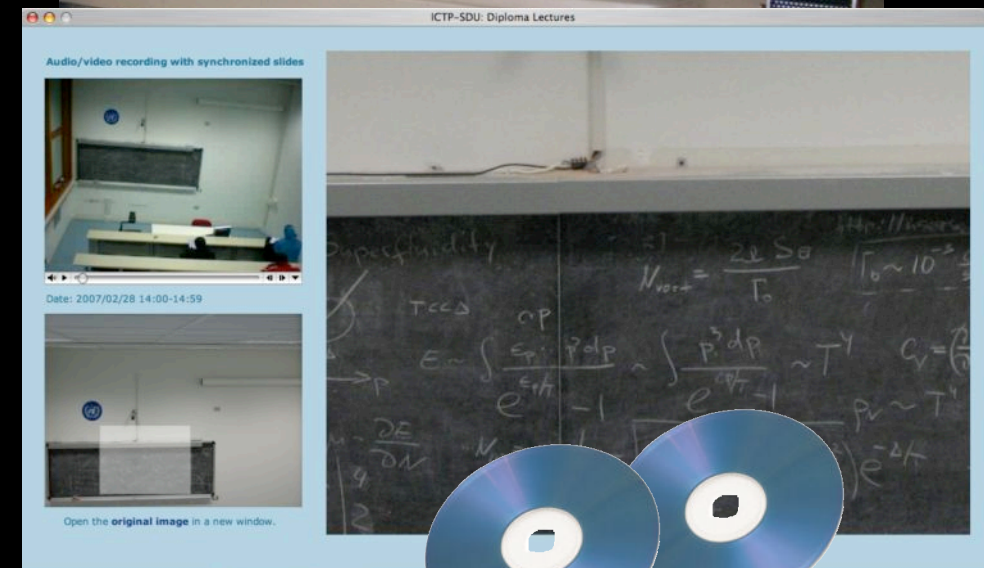
- Scientific lectures given mostly by physicists (from blackboard to PowerPoint slides)
- Different types of room are used for lecturing, staff for recording/assistance is not always available:
  - *from the Main Lecture Hall (huge, with some assistance) to small unattended rooms (here)*

one innovative solution

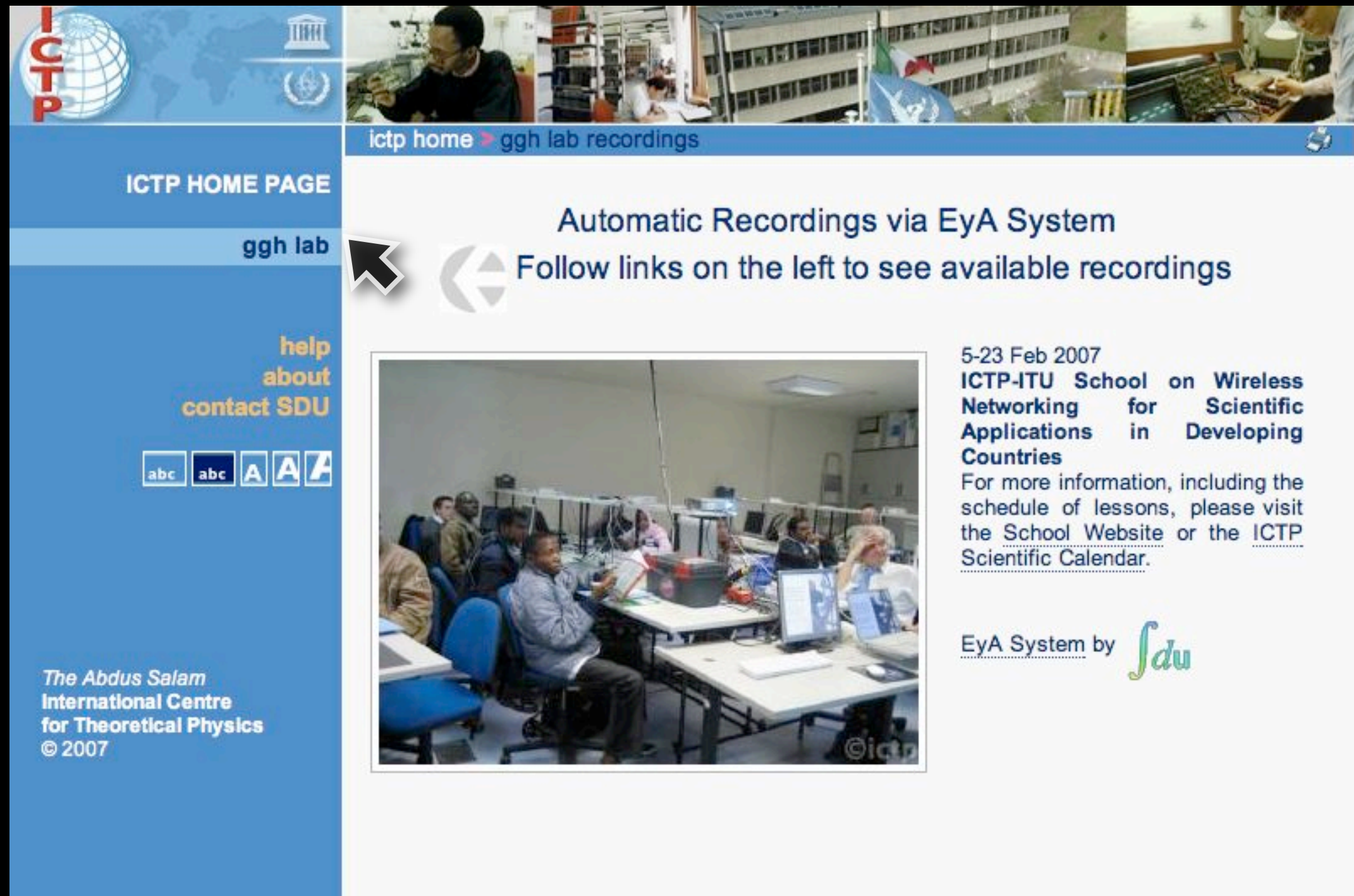


# Enhance your Audience (EyA)

- ▶ during the talk:
  - audio/video recording
  - it also takes photos of the “wall”  
👉 **no human intervention here!**
- ▶ file transfer to server for processing
- ▶ immediately after the talk:
  - synchronization of photos (slides, blackboard, ...) with the video
  - making of a web page (+ zip file)
  - making of CD/DVD  
👉 **no human intervention here too!**



# Screen layout - I



The screenshot displays the ICTP website interface. On the left is a vertical blue navigation bar containing the ICTP logo, a globe, and the text 'ICTP HOME PAGE', 'ggh lab', 'help about contact SDU', and 'The Abdus Salam International Centre for Theoretical Physics © 2007'. The main content area has a blue header with 'ictp home > ggh lab recordings'. Below this is the title 'Automatic Recordings via EyA System' and the instruction 'Follow links on the left to see available recordings'. A photograph shows a classroom with students at computers. To the right of the photo is the text: '5-23 Feb 2007 ICTP-ITU School on Wireless Networking for Scientific Applications in Developing Countries. For more information, including the schedule of lessons, please visit the School Website or the ICTP Scientific Calendar.' At the bottom right, it says 'EyA System by *sdw*'.

ICTP HOME PAGE

ggh lab

help about contact SDU

abc abc A A A

The Abdus Salam International Centre for Theoretical Physics © 2007

ictp home > ggh lab recordings

## Automatic Recordings via EyA System

Follow links on the left to see available recordings

5-23 Feb 2007  
**ICTP-ITU School on Wireless Networking for Scientific Applications in Developing Countries**  
For more information, including the schedule of lessons, please visit the [School Website](#) or the [ICTP Scientific Calendar](#).

EyA System by *sdw*



# Screen layout - 2



The screenshot shows the ICTP website interface. At the top left is the ICTP logo with a globe. To its right are icons for a classical building and the United Nations. A banner image shows a laboratory setting with a person working. Below the banner is a breadcrumb trail: [ictp home](#) > [ggh recordings](#) > [ICTP-ITU-Lab](#). The main content area is titled "Recorded Lectures in ICTP-ITU-Lab" and includes instructions: "Please select the day you are interested in. To change month click on the arrows before and after months name. You need to have the  Apple QuickTime Plugin installed to see the video with synchronized slides. You can download recordings as zip files." Below this is a calendar for February 2007. The calendar has a header "« February 2007 »" and days of the week "Sun Mon Tue Wed Thu Fri Sat". The dates are arranged in a grid. A mouse cursor is pointing at the number 27. On the left sidebar, there are links for "ICTP HOME PAGE", "SCHOOL LECTURES in ggh lab", "help about contact SDU", and a search bar with "abc" and "A A A" buttons. At the bottom left, the text reads "The Abdus Salam International Centre for Theoretical Physics © 2007".

ICTP

ictp home > ggh recordings > ICTP-ITU-Lab

## Recorded Lectures in ICTP-ITU-Lab

Please select the day you are interested in. To change month click on the arrows before and after months name. You need to have the  Apple QuickTime Plugin installed to see the video with synchronized slides. You can download recordings as zip files.

« February 2007 »



Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27				

help about contact SDU

abc abc A A A

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# Screen layout - 3



ictp home > ggh recordings > ICTP-ITU-Lab


## ICTP HOME PAGE

### SCHOOL LECTURES in ggh lab

help about contact SDU

abc abc A A A

## Recorded Lectures in ICTP-ITU-Lab

Please select the day you are interested in. To change month click on the arrows before and after months name. You need to have the  Apple QuickTime Plugin installed to see the video with synchronized slides. You can download recordings as zip files.

« February 2007 »

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

Lectures of February 20 2007	
09.00-09.59: <a href="#">QT video &amp; slides</a>	zip : 123.452MB
10.00-10.59: <a href="#">QT video &amp; slides</a>	zip : 123.551MB
11.00-11.59: <a href="#">QT video &amp; slides</a>	zip : 122.984MB
12.00-12.59: <a href="#">QT video &amp; slides</a>	zip : 108.632MB
14.00-14.59: <a href="#">QT video &amp; slides</a>	zip : 115.659MB
15.00-15.59: <a href="#">QT video &amp; slides</a>	zip : 103.025MB
16.00-16.59: <a href="#">QT video &amp; slides</a>	zip : 99.044MB



# Screen layout - 4

Audio/video recording with synchronized slides



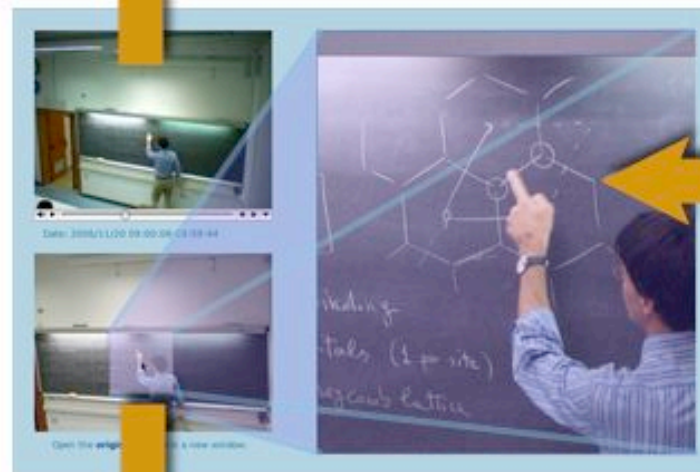
Date: 2007-11-01 11:00-11:59



move mouse over here  
for instructions

Open the **instructions** in a new window.

1 press  to play video and use  to find the beginning of the lecture



this frame will display high-quality zoomed images, synchronized with the video every 15 seconds

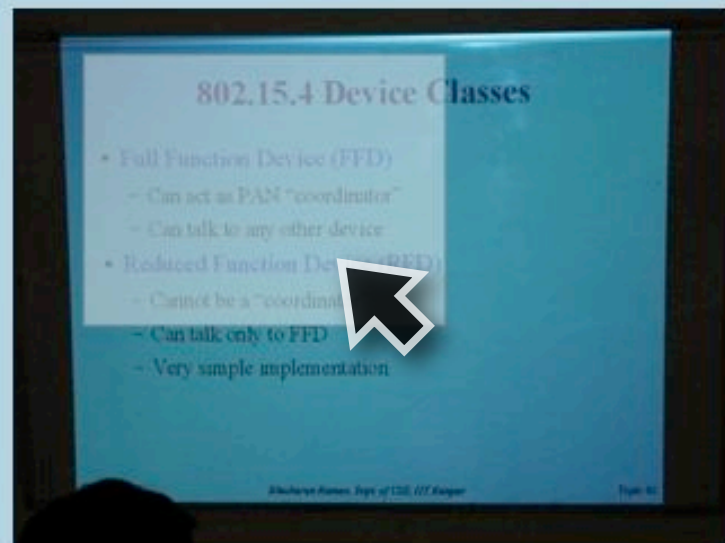
2 move the mouse over this frame to zoom in the image

# Screen layout - 5

Audio/video recording with synchronized slides



Date: 2007/02/20 11:00-11:59



Open the **original image** in a new window.

## 802.15.4 Device

- Full Function Device (FFD)
  - Can act as PAN "coordinator"
  - Can talk to any other device
- Reduced Function Device (RFD)
  - Cannot be a "coordinator"



# “Near Real-Time”



# “Near Real-Time”



**REC on**



# “Near Real-Time”



**REC off**



# “Near Real-Time”



**copy all  
files**



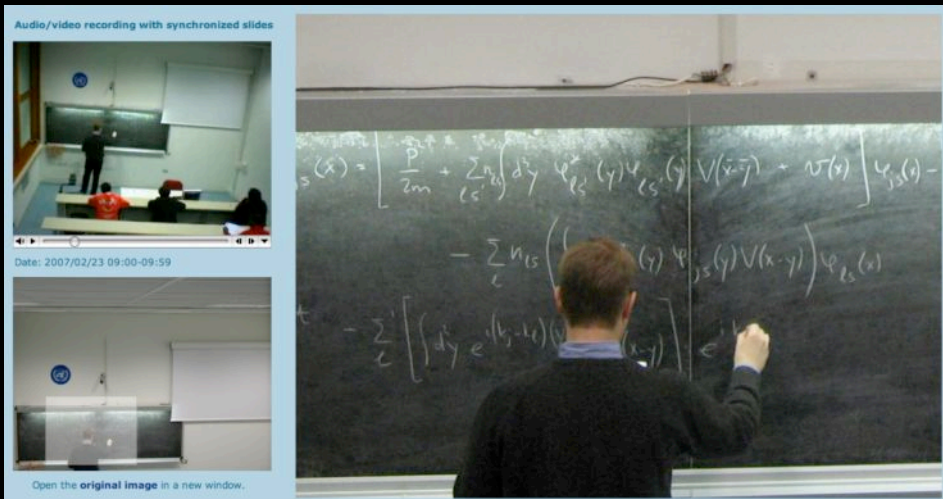
**server**



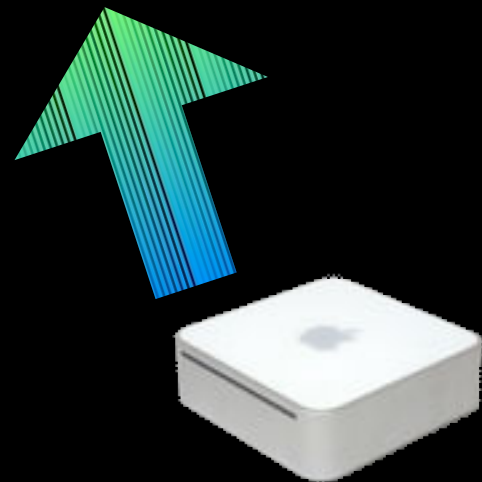


# “Near Real-Time”

<http://www....>



**published  
on the web**



**post-processing**





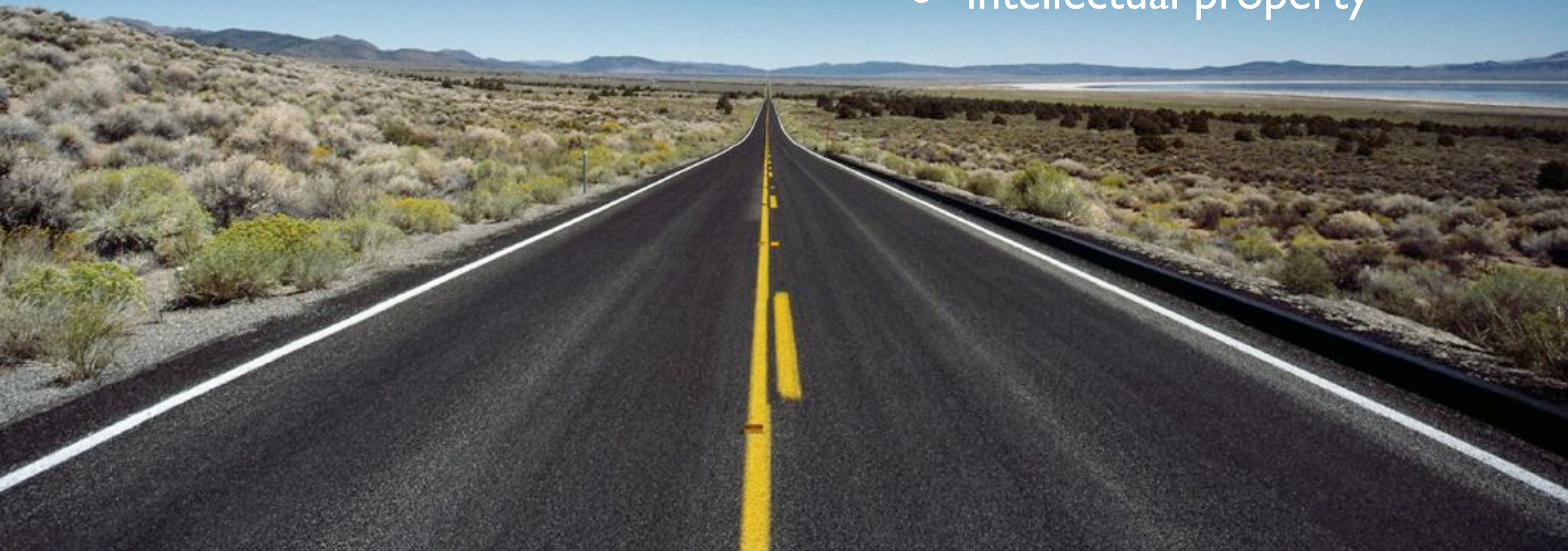
# The way ahead

- future enhancements  
(technology-related):

- touch-screen toaster
- remote conference
- tagging, data mining

- institutional policies  
(decisions to be taken):

- wide adoption
- [www.ictp.tv](http://www.ictp.tv)
- administration
- intellectual property





# Discussion: costs

- **low cost** for system development (done)
- **low cost** for installation  
~ 1000 €/room  
1 – 5000 € for servers
- **no cost** for maintenance and management (*maybe digital camera replacement*)



# Discussion: technology

- other video codecs
  - ➔ **flash** version is under development
- smaller file size
  - ➔ an image comparison technique is also under development
- system control interface
  - ➔ a web interface will be available soon





[www.ictp.tv](http://www.ictp.tv)



$\int du$  (EyA)